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(54) Title of Invention

Interior material and production thereof

## SPECIFICATION

### PURPOSE:

To provide a foamed interior material having sharp uneven patterns identical to printing patterns formed thereto by mechanical embossing and excellent in design effect.

### CONSTRUCTION:

An interior material and its production method wherein printing patterns (2) are formed on the surface of a vinyl chloride type resin layer polymerized by a sodium alkylbenzene sulfonate type emulsifier containing a foaming agent and a plasticizer by using paint containing a foam suppressing agent compatible with the plasticizer; and the vinyl chloride type resin layer is heated and foamed (3) to form uneven patterns (a) and (b) identical to the printing patterns and stripe patterns (4) formed on the protruding pattern parts (b) by an embossing roll. In this case, the foam suppressing agent is benzotriazole.

### [Efficacy of the invention]

By this method, the interior material having sharp patterns identical to the printing patterns formed to the concave areas thereof by chemical embossing and having a sharp embossed design formed to the foamed layer of the convex areas thereof by the embossing roll and novel printing patterns with embossed design is obtained.

### [Scope of Claims]

#### [Claim 1]

An interior material wherein printing patterns are formed on the surface of a vinyl chloride type resin layer polymerized by a sodium alkylbenzene sulfonate type emulsifier and containing a foaming agent and a plasticizer by using paint containing a foam suppressing agent compatible with the plasticizer; and the vinyl chloride type resin layer is heated and foamed to form uneven patterns identical to the said printing patterns, and stripe patterns are formed on the protruding pattern parts by an embossing roll.

#### [Claim 2]

An interior material as defined in claim 1, characterized in that the foam suppressing agent is benzotriazole.

#### [Claim 3]

A production method for an interior material wherein printing patterns are formed on the surface of a vinyl chloride type resin layer polymerized by a sodium alkylbenzene sulfonate type emulsifier and containing a foaming agent and a plasticizer by using paint containing a foam suppressing agent compatible with the plasticizer; and the vinyl chloride type resin layer is heated and foamed to form uneven patterns identical to the said printing patterns, and stripe patterns are formed on the protruding pattern parts by an embossing roll.

### [Description of the Invention]

[0001]

The present invention relates to the production method for an interior material used for wall coverings and ceilings, and more specifically, a foamed interior material having uneven patterns produced by a chemical emboss method.

[0002]

[Prior Art Technology]

Conventionally, the following two methods are known as methods to produce a foamed interior material having uneven patterns.

The first method is that the desired patterns are painted on the surface of an un-foamed vinyl chloride type resin layer containing a foaming agent by using paint containing a foam suppressing agent. Then, the vinyl chloride type resin layer is foamed to form uneven patterns on the non-painted areas while the painted areas are suppressed from foaming to produce identical uneven patterns to the original printing patterns.

The second method is that the desired patterns are painted on the surface of an un-foamed vinyl chloride type resin layer containing a foaming agent by using paint containing a foam accelerating agent. Then, the painted areas of the vinyl chloride type resin layer is foamed larger to produce uneven patterns than the non-painted areas to produce the identical uneven patterns to the original printing patterns.

These methods are so called conventional chemical embossing methods producing identical uneven patterns to the original printing patterns by shrinking or expanding the printing areas compared to the non-painted areas.

[0003]

Moreover, alternatively, a so called mechanical embossing method in which an un-foamed synthetic resin layer containing a foaming agent is superimposed on a base, then the said synthetic resin layer is heated and foamed to produce uneven patterns on the surface with an embossing roll is known.

[0004]

The advantage of a foamed interior material by a chemical embossing method is that the obtained uneven patterns are identical to the printing patterns, however the design of printing patterns available with this method are simple. More specifically, producing sharp and fine uneven patterns, and right angle patterns are impossible with this method. On the other hand, an interior material produced by a mechanical embossing method is capable of producing fine, sharp uneven patterns on the sheet surface with a specific type of an embossing roll. However, producing identical uneven patterns to the printing patterns has been mechanically quite difficult due to the sheet shrinkage.

[0005]

To solve the foregoing problems, there has been a proposal that combined both the chemical embossing method and the mechanical embossing method in Japanese Patent Publication No. Sho 61-20422, wherein the desired patterns are painted on the surface of an un-foamed vinyl chloride type resin layer containing a foaming agent by using paint containing a foam suppressing agent, then, the vinyl chloride type resin layer is heated and foamed followed by producing embossing design on the surface with an embossing roll. By this method, one can take advantages of both the chemical embossing method and the mechanical embossing method to some degree. However, the sharpness of the embossing design in the mechanically embossed areas is decreased as it is foamed after mechanical embossing. Moreover, the sharpness of the painting patterns in the areas painted with paint containing a forming suppressing agent is also decreased due to mechanical embossing.

[0006]

[Problems Overcome by the Invention]

To solve the foregoing problems, to maximize the synchronization of printing patterns and uneven patterns and the sharpness of the printing patterns of the chemical embossing method, moreover to produce the excellent uneven printing patterns with design effect, the present inventors carried out an extensive investigation. After printing with paint containing a foam suppressing agent on the surface of an un-foamed vinyl chloride type resin layer containing a foaming agent, the vinyl chloride type resin layer is heated and foamed to form identical uneven patterns with the printing patterns. Then, uneven stripe patterns were produced on the surface of the foamed layer with an embossing roll. However, this method brought about the problem that the lack of sharpness of the printing patterns on the recessed areas became evident since the foamed layer of the surrounding concave areas created by the printing patterns are twisted and overlap each other with the force of an embossing roll.

[0007]

Moreover, it is possible to overlay transparent films or sheets having different melting temperatures on the surface of a vinyl chloride type resin layer to clearly imprint and form the printed uneven stripe patterns with an embossing roll in the mechanical embossing step. Hence the thickness of the layer increases as transparent films or sheets are overlaid, and it is not favorable to use as a wall covering material or ceiling material as the material weights do not satisfy the frame-resistance standard.

[0008]

The objective of the present invention is to solve the foregoing problems and to provide a foamed interior material having identical uneven patterns with the printing patterns, and forming sharp, uneven stripe patterns thereto by mechanical embossing and excellent design effect.

[0009]

[Problem Resolution Means]

After extensive research to solve the foregoing problems, the inventors of the present invention found that a tangent line of the concave areas that suppresses foaming (a) and the surrounding foamed areas (b) at the curve inflection point (p) of the vertical section, an acute

angle ( $\iota$ ) between the surface of a base (1) and the parallel line (hereinafter referred to as tumble angle), and the types of a vinyl chloride type resin used (refer to FIG. 1) are the significant factors for the successful production of a foamed interior material. More specifically, when a tumble angle ( $\iota$ ) is greater than 40 degree and the surface of the foamed vinyl chloride type resin layer is imprinted by an embossing roll, the force in the rolling direction covers the printing patterns of a concave area (a) to a foamed layer (b) and transforms (c) (refer to FIG. 3). Moreover, the inventors found that this transformation also depends on the type of vinyl chloride resin used.

[0010]

Generally, it is suitable to have a tumble angel of the said concave area having close to a right angle in order to produce sharp, uneven patterns (a), (b) on the chemical embossing method. Hence, the layer combined the trimellitic acid type foam suppressing agent and a vinyl chloride resin polymerized by a sodium alkyl sulfonate type emulsifier is used. However, with this combination which can produce favorable uneven patterns (a), (b) when only the chemical embossing method is used, the printing patterns in the concave area (a) is covered with the surrounding foamed layer (b) at the step of imprinting with an embossing roll thereafter.

[0011]

Hence, when the method to decrease the tumble angle ( $\iota$ ) at the concave area to 40 degrees or smaller was sought, the inventors of the present invention found out that the tumble angle of the concave area greatly depended on the compatibility between a foam suppressing agent and the plasticizer used. More specifically, the foam suppressing agent easily transfers to the plasticizer in the vinyl chloride type resin when the foam suppressing agent and the plasticizer are compatible, and the foam suppressing agent does not transfer to the plasticizer when they are not compatible. Therefore, the inventors of the present invention attempted to adjust the angle by transferring the foam suppressing agent after the embrocation.

[0012]

The foam suppressing agent in paint transfers slowly from the central part of the printing pattern areas with a concentration gradient when the foam suppressing agent which has compatibility with a plasticizer is used. Therefore, when it is foamed, it foams in the printing areas as a center with a gradual slope to minimize the tumble angle at the concave areas of 40 degrees or less.

[0013]

Moreover, even the tumble angle of the concave area is 40 degrees or less, when a vinyl chloride type resin layer polymerized by a sodium alkyl sulfate type emulsifier such as sodium lauryl sulfate conventionally used in the chemical embossing method, the printing patterns on the concave areas tend to be covered by the surrounding foamed areas at the time of imprinting the convex patterning areas with an embossing roll followed by foaming. After further investigation, the use of a vinyl chloride type resin polymerized by a sodium-alkyl benzene sulfonate type emulsifier turned out to be suitable for this purpose as the concave areas are not covered by the surrounding foamed areas at the time of imprinting with an embossing roll.

[0014]

Therefore, the measure that the present invention took is to form the printing pattern on the surface of the vinyl chloride polymerized by a sodium alkyl benzene sulfonate type emulsifier containing a foaming agent and a plasticizer by using paint containing a foam suppressing agent compatible with the plasticizer. Then, the vinyl chloride type resin layer is heated and foamed to form uneven patterns which are identical to the printing patterns and embossing design formed on the convex pattern areas by an embossing roll, in order to provide an interior material. In this case, the foam suppressing agent is benzotriazole. As a production method, a vinyl chloride type resin paste containing the vinyl chloride type resin polymerized by the sodium alkyl benzene sulfonate type emulsifier, a foaming agent, and a plasticizer is painted on a base. The said paste was heated to gelatinize, and the printing patterns were formed thereon by using paint containing a foam suppressing agent compatible with the said plasticizer, then the said built-up body is heated and foamed to expand the uneven patterns which are identical to the printing pattern. Lastly, the embossing design is formed on the convex pattern areas of the said built-up body by using an embossing roll.

[0015]

(Effect)

By this method, the interior material having recessed patterns identical to the printing patterns and having sharp embossed design with novel printing patterns is obtained.

[0016]

(Embodiment)

An embodiment of the interior material in the present invention is described hereafter, with reference to the drawings. The interior material formed by the method wherein a vinyl chloride type resin paste containing the vinyl chloride type resin polymerized by the sodium alkyl benzene sulfonate type emulsifier, a foaming agent, and a plasticizer is painted on a base (1). The paste was heated to gelatinize and the printing patterns (2) formed on the surface by using paint containing a foam suppressing agent compatible with the plasticizer, then the built-up body is heated and foamed (3) to expand the uneven patterns (a), (b) which are identical to the printing pattern (2). Lastly, the embossing design(4) is formed on the convex pattern area (b) of the said built-up body by using an embossing roll.

[0017]

The term "foam suppressing agent" compatible with a plasticizer in the present invention refers to the agent dissolved to a plasticizer added in a vinyl chloride resin layer or a foam suppressing agent which is mixable when it is in an aqueous state.

For instance, the agent which dissolves or is mixable with a plasticizer in the following test is considered to be compatible and suitable for the present purpose.

(Method to test a chemical solubility to a plasticizer)

Mix 100g of a plasticizer (aqueous) and 1g of a foam suppressing agent (solid) in a beaker to

see if the agent dissolves in a plasticizer after 2-4h of stirring over a magnet stirrer. Moreover, in case that a foam suppressing agent is in an aqueous state, mix 100g of a plasticizer (liquid) and 1g of a foam suppressing agent (aqueous) in a beaker to see if they are mixable. Using the above methods one can determine whether a foam suppressing agent dissolved in a plasticizer is compatible with the plasticizer. The foam suppressing agents that are capable of dissolving or being mixed with a plasticizer transfer to the plasticizer are used appropriately for the purpose as it is compatible with the plasticizer.

[0018]

The kind of a plasticizer added to a vinyl chloride type resin in the present invention is a generally used plasticizer. For instance, besides di-2-ethylhexyl phthalate (DOP), phthalate ester type plasticizers including dioctyl phthalate (DnOP) and dibutyl phthalate (DBP), phosphate ester type plasticizers including tricresyl phosphate (TCP), di-2-ethylhexyl adipate, sebacic acid ester plasticizer, polyester type plasticizers are used. Moreover, as a secondary plasticizer, epoxy type plasticizers such as an epoxy soybean oil or chlotide paraffin may also be used. The recommended amount of these plasticizers is within 20-80 parts by weight of the plasticizer to 100 parts by weight of a vinyl chloride type resin in order to get the sufficient strength of the vinyl chloride type resin, the transferability of the plasticizer and the bleed. These plasticizers may be used in combination.

[0019]

The term "foam suppressing agent" in the present invention refers to the substance that substantially suppresses the breakdown of a foaming agent at the melting temperature of the foaming agent in a vinyl chloride type resin, and the type of the foam suppressing agent depends on the kind of the foaming agent used.

[0020]

As a foaming agent added in the vinyl chloride type resin, a conventional foaming agent used in the foamed interior material made of a vinyl chloride type resin can be used. For instance, these foaming agents include azodicarbonamide (ADCA), dinitroso pentamethylene tetramine (DPT), azobisisobutyronitrile (AIBN), and 4,4'-Oxybisbenzenesulfonic acid dihydrazide (OBSh). Moreover, besides these foaming agents, a kicker to decrease the break down temperature of the foaming agents may be added to the vinyl chloride type resin before foaming. For instances, when ADCA is used as a foaming agent, zinc oxide, zinc soap, cadmium soap, lead soap can be used as a kicker to decrease the break down temperature of ADCA.

[0021]

The foam suppressing agent is effective only when it is used with a proper foaming agent. Some of the foam suppressing agents are effective in decreasing the breakdown temperature of the foaming agent itself and others are effective in inhibiting the effect by a kicker. Thus, the selection of the agent has to be properly made. The foaming agent inhibiting the effect of a kicker prevents it from breaking down until it reaches the break down temperature of the original foaming agents by inhibiting the effect of the kicker and creates a foaming areas and non-foaming areas due to differences in the break down temperatures.

is 40 degrees or less, the printing patterns of the concave areas come to lack sharpness, since the foaming layer around of the chemical embossing concave areas displaces in a rolling direction and covers the concave areas due to the force caused by applying a embossing roll.

[0027]

Thus, after further investigation to find a vinyl chloride resin that is more resistant to the foaming layer covering the concave areas, the best results were obtained from a vinyl chloride resin polymerized by a sodium alkylbenzene sulfonate type emulsifier. The effect does not depend on the amount of polymerization, and any kind of the vinyl chloride resin polymerized by a sodium alkylbenzene sulfonate type emulsifier usually used is favorable. In general, the best results are obtained from a vinyl chloride type resin polymerized by a sodium alkylbenzene sulfonate type emulsifier with a polymerization degree of 50-300. Moreover, an emulsifier having 8-16 carbons in the alkyl group is favorable for a sodium alkylbenzene sulfonate type emulsifier, such as a sodium dodecylbenzenesulfate.

[0028]

The base (1) used in the present invention is not limited to a specific kind. For instance, a textile fabric or non-textile made from fabric frame-resistant paper containing heat-resistant substances such as metal hydrate including aluminum hydroxide and magnesium hydroxide, non-inflammable paper, natural fiber, synthetic fiber, glass fiber can be used.

Furthermore, the recommended thickness of the base is thinner than 0.5mm due to reasons of fire safety in case these heavy bases are used for the wall covering and ceiling. Furthermore, considering the thickness of the vinyl chloride type resin layer overlay thereon; the use of a base with a thickness of 0.05-0.2mm is favorable.

[0029]

The build-up of the vinyl chloride type resin on the base (1) is done first by directly painting the vinyl chloride type resin paste on the base (1), then heating to gelatinize at 100-170°C, which is lower than the foaming temperature to build-up the vinyl chloride type resin thereon. Alternatively, this is achieved by painting the vinyl chloride type paste on a mold such a paper mold, then gelatinizing it to form a vinyl chloride type resin sheet. Lastly, the sheet is removed from the mold and overlaid on the base by using an adhesive, heat or heat lamination method.

[0030]

When the built-up body of the base and the vinyl chloride type resin are used as wall coverings and for the ceiling, there is a weight limitation in accordance with fire safe performance. For instance, when the second degree of fire safe performance is required for a vinyl wallpaper, the weight should be lighter than 400g/m<sup>2</sup>. Accordingly, a weight of a vinyl chloride type resin also has to be adjusted. When the weight of a frame resistant base is 70g/m<sup>2</sup>, then the weight of a vinyl chloride type resin should be less than 330g/m<sup>2</sup>. When the relative density of the vinyl chloride type resin is 1.2, the thickness of the vinyl chloride type resin layer becomes below 0.17-0.33mm. The thickness and weight of the vinyl chloride type resin layer is determined in terms of fire safe performance. However, the vinyl chloride type resin layer is usually made with a thickness of approximately 0.1-0.5mm. Furthermore, there is no

limitation in the width and length of the built-up body, however it is formed in a long length with a width of 800-1500mm and cut to an appropriate length according to the place of use.

[0031]

When the foaming scale of the vinyl chloride type resin layer is too low, the steps between the concave areas and the convex areas become too small for chemical embossing. On the other hand, when the foaming scale is too high, the vinyl chloride type resin foaming layer (3) collapses, and loses strength and elasticity. Thus foaming the resin with a foaming scale of 1.5-6 is favorable. With the present invention, after vinyl chloride type resin layer is foamed while the printing pattern areas (2) formed by a paint containing the foam suppressing agent are un-foamed, the resultant products are heated with a heater such as a infrared heater to soften or melt the surface, then the arbitrary embossed designs (4) are formed by an embossing roll on the convex patterns (b) of the vinyl chloride type foaming layer (3).

[0032]

The embossing roll is the metallic roll forming embossing design and having 200-100m in diameter and 1-2m in width. By passing the built-up body of the foamed vinyl chloride type resin layer (3) and the base (1) between the metallic embossing roll and a rubber roll, the embossing design (4) is printed on the surface of the vinyl chloride type resin layer. Mechanical embossing is performed either by placing a certain air separation between the embossing roll and the rubber roll to print or by pressing the embossing roll and the rubber roll without having an air separation between them. Moreover, a known processing agent may be painted to foam a coat on the surface of the vinyl chloride type resin layer to make it pollution-resistant with a thickness of approximately 1-30 $\mu$ m before or after embossing the embossing design (4) mechanically by using an embossing roll.

[0033]

Moreover, the type of stabilizer is not limited to a certain kinds, however the best results are obtained from the foaming stabilizer generally used for a vinyl chloride type resin. The zinc containing stabilizer such as calcium-zinc series, barium-zinc series, potassium-zinc series, zinc-sodium-potassium-barium complex stabilizer, and zinc-calcium-tin complex stabilizer give the favorable results depend on the combination with a foaming agent. Furthermore, the chemical compound may be added to adjust the breakdown temperature of a foaming agent, the size and the strength of the cell in a vinyl chloride type resin foaming body. However, the kind of compound is not limited to those compounds described.

[0034]

Next, the embodiment of the present invention and the comparative example are further described. Using the test described in [0017], the solubility and transferability to DOP was measured after the foam suppressive agent was mixed with DOP. The transferability to DOP was measured as follows. First, paint containing a foam suppressive agent with 10 parts by weight was prepared and used to print on the surface of vinyl chloride resin layer. After being dried for 24 hours, the presence of the foam suppressive agent on the surrounding printing areas was measured by using gas chromatography or liquid chromatography. It was judged to be "good" when the foam suppressive agent was detected. However, it should be noted that some of the agents can be used as a foam suppressive agents if the agent dissolves or is

mixable with other plasticizers, even if it does not dissolve or is mixable with DOP.

[0035]

Solubility and transferability test of DOP and various foam suppressing agents

Foam suppressing agent	Solubility	Transferability
Adipate	Poor	Poor
Phthalate	Poor	Poor
Maleic anhydride	Good	Good
C15A4 tetrahydrophthalic anhydride	Good	Good
Trimellitic acid anhydride	Poor	Poor
Tetrachloro phthalate anhydride	Poor	Poor
Benzotriazol	Good	Good
2-benzothiazolethiol	Good	Good
Terephthaloyl chloride	Poor	Poor
Acetyl acetone (aqueous)	Good (mixable)	Good

[0036]

Next, the vinyl chloride resin past was prepared in accordance with the composition I (embodiment) and composition II (comparative example) listed below. The parts were coated using a paste coater for flame-resistant treatment. The paste was spread with a thickness of 0.16mm on the base made of flame-resistant paper with a thickness of 0.12mm before heating in a furnace oven at 160°C for 50 seconds to dry and gelatinize.

[0037]

(Table 1)

Composition	I	II
PVC*1	100	
PVC*2		100
DOP	45	45
Secondary plasticizer	5	3
Stabilizer(Ca-Zn series)	2	2
Azodicarbonamide	4	4
Kicker(ZnO)	1	1
Filling (CaCO <sub>3</sub> )	50	50
Cell adjuster	1	1
Colorant	15	15

Remarks:

\*1: a vinyl chloride type resin polymerized by a sodium dodecylbenzenesulfonate as an emulsifier  
\*2: a vinyl chloride type resin polymerized by a sodium laurylsulfonate as an emulsifier.

[0038]

Desired printings were photogravured using paint containing the following foam suppressing agent with 10 parts by weight on the surface of the vinyl chloride resin layer formed from the above mentioned composition I and II. After 24 hours, the vinyl chloride resin layer was heated in a furnace oven at 210 °C for 60 seconds. Then, the vinyl chloride resin layer was foamed to express the chemical emboss uneven patterns.

- a. Benzotriazole
- b. Trimellitic acid anhydride
- c. Maleic anhydride
- d. cis-4 tetrahydrophthalic anhydride

[0039]

Next, a mechanical emboss design was formed by imprinting the emboss design on the surface of the foamed convex patterns of the vinyl chloride resin layer using the metallic emboss roll engraved with reflected patterns after heating with a far infrared heater. The results for each built-up body are described below.

[0040]

[Table 2]

PVC layer	Composition I	Composition I	Composition I	Composition I
Foam suppressive agent	a	b	c	d
Tumble angle of the concave areas	30°	50°	25°	20°
Covered chemical embossing concave areas *1	Covered	none	covered	Covered
PVC layer	Composition II	Composition II	Composition II	Composition II
Foam suppressive agent	a	b	c	d
Tumble angle of the concave areas	35°	33°	35°	25°
Covered chemical embossing concave areas*1	None	none	none	None

(Remark):

The covering test of chemical concave areas was judged by the printing pattern of the chemical embossing concave areas is covered (covered) or not covered and maintaining sharp printing patterns (none) after imprinting with an embossing roll.

[0041]

From the above results, the tumble angles of the recessed areas with 40 degrees or less are formed with a gradual slope by using the foam suppressing agent compatible to a plasticizer. Moreover, compared to the vinyl chloride resin layer polymerized by a sodium alkyl sulfonate type emulsifier, the vinyl chloride resin layer polymerized by a sodium alkylbenzene sulfonate

type emulsifier does not cover by a surrounding foamed area (b) to transform (c) by the printing patterns (2) of the chemical embossing concave area (a) as described in FIG.3, and forms an interior material having quite sharp patterns (2) on the concave area (a) and having sharp embossing design as described in FIG.2.

[0042]

[Efficacy of the Invention]

The interior material of the present invention has the following characteristics:

a foam suppressing agent transfers into a plasticizer by using the substance as a foam suppressing agent that is compatible with the plasticizer to create gradual tumble angles at the recessing areas;

the printing patterns of the concave areas do not get lost or the border areas between the concave area or the foaming areas do not lose the sharpness as the foamed layer of the convex printing areas do not cover the chemical emboss concave area at the time of imprinting with an embossing roll by the use of the vinyl chloride resin layer polymerized by a sodium alkylbenzene sulfonate type emulsifier;

the printing patterns of the concave area clearly remain; and

the resultant interior material having sharp patterns formed on the concave areas by the chemical embossing thereof and having a sharp embossed design formed to the foamed layer of the convex areas thereof by the mechanical embossing and novel printing patterns with embossed design is obtained.

[0043]

Moreover, in case that benzotriazole is used as a foam suppressing agent, the foamed chemical emboss recessed area remains almost un-foamed and properly transferred to a plasticizer as benzotriazole it is better in its foam suppressing effect compared to other foam suppressing agents. Thus, the tumble angles at the chemical emboss concave areas becomes smaller, which further results in an interior material having a much sharper printing patterns of the concave areas.

[Brief Description of the Drawing]

[FIG.1] schematic view of a tumble angle at the recessed area

[FIG.2] enlarged sectional view of the embodiment

[FIG.3] enlarged sectional view of the comparative example

[Description of Numbers and Letters]

1: Base

2: Printing pattern

3: Vinyl chloride resin foamed layer

a: Foamed concave area

b: Foamed convex area

c: Embossing design

[FIG.1]

[FIG.2]

[FIG.3]

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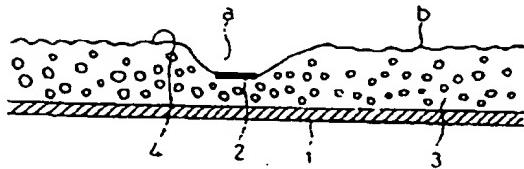
(54) 【発明の名称】 内装材及びその製造方法

(57) 【要約】

【目的】 本発明は印刷模様と同調した凹凸模様を有し、かつメカニカルエンボスによる鮮明な凹凸模様を形成した意匠性に優れた発泡内装材を提供する。

【構成】 アルキルベンゼンスルフォン酸ナトリウム系の乳化剤により重合されかつ発泡剤及び可塑剤が添加された塩化ビニル系樹脂層の表面に、該可塑剤と親和性のある発泡抑制剤を含有する塗料で印刷模様2を形成し、その後加熱発泡3して該印刷模様と同調した凹凸模様a、bとし、その表面にエンボスロールで凸模様部1に校模様4を形成してなる内装材を提供すると共に、発泡抑制剤がベンゾトリアゾールであること及びその製造方法である。

【効果】 凹部にはケミカルエンボスによる印刷模様と同調した鮮明な模様を有しつつ、凸部の発泡層にはエンボスロールによるシャープな校章匠が形成され、従来にない新規な印刷模様、校意匠を持つ内装材となる。



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PVC層	配合①	配合②	配合③	配合④
発泡抑制剤	a	b	c	d
抑制部落ち込み角度	30度	50度	25度	20度
ケミカル凹部被り性 (注1)	○	×	○	○
PVC層	配合⑤	配合⑥	配合⑦	配合⑧
発泡抑制剤	a	b	c	d
抑制部落ち込み角度	35度	55度	35度	25度
ケミカル凹部被り性 (注1)	×	×	×	×

(注1) : ケミカル凹部被り性はエンボスロールにて型押し後、ケミカルエンボス凹部印刷模様が周囲の発泡層によって被さらず、印刷模様が鮮明に残っているものを○、被さってしまったものを×とした。

【0041】以上の結果より、可塑剤と親和性のある発泡抑制剤を使用することにより、抑制部の落ち込み角度tが40度以下のスロープ状となり、かつ、アルキルベンゼンズルファン酸ナトリウム系の乳化剤によって重合された塩化ビニル樹脂層を用いたものは、アルキル硫酸ナトリウム系の乳化剤によって重合された塩化ビニル樹脂に比較して、図3のようにケミカルエンボスによる凹部aの印刷模様2に周囲の発泡層bが変形cとして被さつてしまふこともなく、図2に示すように凹部aの印刷模様2が非常に鮮明で、型押し絞模様4も鮮明なものであった。

#### 【0042】

【発明の効果】本発明の内装材は発泡抑制剤として可塑剤と親和性のある物質を用いることにより、発泡抑制剤が可塑剤中へ移行し、ケミカルエンボスの抑制部の落ち込み角度が緩やかとなり、併せてアルキルベンゼンズルファン酸ナトリウム系の乳化剤を用いて重合された塩化ビニル樹脂を使用することにより、エンボスロールの型押し工程時に凸模様部の発泡層がケミカルエンボス凹部に被さって凹部の印刷模様が失われてしまったり、凹部

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と発泡層との境界部が不鮮明になることなく、凹部の印刷模様はより一層鮮明な状態で保持され、得られる内装材はケミカルエンボスによる凹部の鮮明な印刷模様と凸模様部の発泡層のメカニカルエンボスによる絞意匠とを兼ね備えた従来にない新規な模様を有するものとなる。

【0043】また、発泡抑制剤としてベンゾトリアゾールを用いた場合は、他の発泡抑制剤と比較して発泡抑制効果が大きいので、その塗布部のケミカルエンボス凹部はほとんど発泡せず印刷模様が鮮明に残り、且つ可塑剤へ適度に移行するため、ケミカルエンボスの抑制部の落ち込み角度が緩やかになり、得られる内装材は凹部の印刷模様がより一層鮮明なものとなる。

#### 【図面の簡単な説明】

【図1】 抑制部の落ち込み角度の説明図

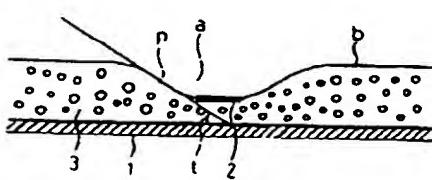
【図2】 実施例の拡大断面図

【図3】 比較例の拡大断面図

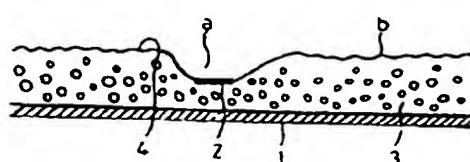
#### 【符号の説明】

1 : 基材、2 : 印刷模様、3 : 塩化ビニル樹脂発泡層、  
a : 発泡凹部、b : 発泡凸部、4 : 絞模様、

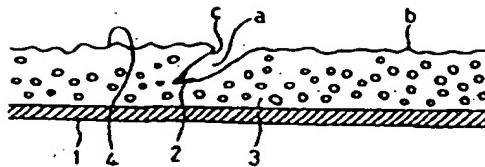
【図1】



【図2】



【図3】



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